

REMARKS

In this Amendment, Applicants cancel claim 12, without prejudice or disclaimer of its subject matter, and amend claims 1 – 11 to more appropriately define the present invention. Upon entry of this Amendment, claims 1 – 11 remain pending and under current examination.

Regarding the Office Action:

In the Office Action, the Examiner rejected claims 1 – 7 and 11 under 35 U.S.C. § 103(a) as unpatentable over Lofredo (U.S. Patent No. 4,012,490) in view of Foster, et al. (U.S. Patent No. 4,163,775); and rejected claims 8 – 10 and 12 under 35 U.S.C. § 103(a) as unpatentable over Lofredo and Foster, and further in view of Chakraborty (U.S. Patent No. 5,495,511).

Applicants appreciate the Examiner's thorough examination of this application, especially the detailed citations which aided Applicants in reviewing the Examiner's comments. Nevertheless, Applicants respectfully traverse the rejections, as detailed above, for the following reasons.

Regarding the Claim Amendments:

Applicants amend claims 1 – 11 to more appropriately define the present invention. Applicants have amended independent claim 1 to include elements of now-cancelled claim 12. In addition, further amendments to claim 1 draw support from the specification, for example, on page 2, lines 20 – 25, and page 14, line 15 to page 15, line 11. Applicants have amended claims 2 – 11 to render the preamble consistent with now-amended claim 1, and for no other reason. Applicants submit that the amendments contain no new matter, in accordance with the requirements of 37 C.F.R. § 1.121(f) and the references to the disclosure that follow.

Applicants respectfully point out that “[a]mendments to an application which are supported in the original description are NOT new matter” (M.P.E.P. § 2163.07, emphasis in

original), and “[e]ach claim must be separately analyzed and given its broadest reasonable interpretation in light of and consistent with the written description” (M.P.E.P. § 2163(II)(A)(1)).

Regarding the Rejection of Claims 1 – 7 and 11 under 35 U.S.C. § 103(a):

Applicants respectfully traverse the rejection of claims 1 – 7 and 11 under 35 U.S.C. § 103(a) as unpatentable over Lofredo in view of Foster. Applicants respectfully disagree with the Examiner’s arguments and conclusions, and respectfully submit that a *prima facie* case of obviousness has not been established.

In order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, the prior art reference (or references when combined) must teach or suggest all the claim elements. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference or to combine reference teachings. Third, there must be a reasonable expectation of success. *See* M.P.E.P. § 2143.

The Examiner does not show that all the elements of Applicants’ claims are met in the cited references, does not show that there is any suggestion or motivation to modify the cited references to result in the claimed invention, *without the benefit of Applicants’ specification*, and does not show there would be any reasonable expectation of success from so doing.

Prior Art Reference Must Teach or Suggest All the Claim Elements

Applicants respectfully point out that the first requirement for establishing a *prima facie* case of obviousness has not been established since the cited references do not teach or suggest each and every element of Applicants’ claimed invention.

In particular, Lofredo, whether taken alone or in combination with Foster, does not teach or suggest each and every element of Applicants’ claimed invention. This is evidenced from the arguments that follow.

To begin, Applicants' independent claim 1 recites, *inter alia*, “*a hydrogen removing apparatus* arranged within the nuclear reactor-housing vessel, wherein the hydrogen removing apparatus comprises a reactor having two openings for circulating the gaseous materials within the nuclear reactor-housing vessel into the reactor, and a catalyst bed arranged within the reactor and loaded with a catalyst for an ammonia synthesizing reaction between a nitrogen gas and a hydrogen gas” (emphasis added).

First, Applicants points out that the Examiner has admitted one of Lofredo's deficiencies, namely, “Lofredo does not teach ammonia synthesis, catalyst bed amounts, catalyst carriers and associated surface areas and co-catalysts” (Office Action, p. 3).

In an attempt to compensate for Lofredo's deficiencies, the Examiner relied on Foster, alleging that “Foster et al. discloses the synthesis of ammonia from hydrogen using a catalyst supported on graphite.” *See* Office Action, p. 3. Nevertheless, Foster fails to cure Lofredo's deficiencies, for the reasons set forth below.

Regarding Lofredo, Applicants submit that Lofredo is directed to “*Removing Radioactive Noble Gases from Nuclear Process Off-Gases*” (Lofredo, Title, emphasis added). As disclosed in Lofredo,

“[t]he present invention is concerned with providing an improved and simplified system for safely *isolating radioactive noble gases* from the environment and is applicable to systems for removing krypton and xenon from air, argon, nitrogen, CH₄, CO and mixtures thereof as applied to nuclear power plants of the boiling water reactor, pressurized water reactor, fast flux and breeder reactor types or any other reactors that generate the above gas mixtures” (Lofredo, col. 1, lines 50 – 60, emphasis added).

Applicants note that it is therefore impossible for Lofredo to teach or suggest at least Applicants' claimed "*a hydrogen removing apparatus* arranged within the nuclear reactor-housing vessel" (claim 1, emphasis added), for the very reason that hydrogen is not a noble gas.

Furthermore, Lofredo actually teaches the use of hydrogen in its system for removing *noble* gases such as krypton and xenon: "The effluent gas from the column, essentially nitrogen (N₂) and *hydrogen* (H₂), *is advantageously used for system cooling and to elute and remove the CO₂ and Xe from the adsorbers above*" (Lofredo, col. 2, lines 18 – 22, emphasis added). Likewise, Lofredo teaches that "*Hydrogen is added* to react with [sic] the elemental O₂ component of air in the feed stream," in "[a] RECOMBINER." See Lofredo, col. 3, lines 22 – 27, italics added.

Thus, Lofredo's object "is to provide an improved and simplified *system for efficiently and safely receiving, separating, concentrating and storing radioactive noble gases such as krypton and xenon* that are included in the off-gas from nuclear systems such as boiling water nuclear reactors and processes involving the manufacture, use, or reprocessing of nuclear fuel" (Lofredo, col. 2, lines 39 – 46, emphasis added).

It is therefore abundantly clear that, in addition to the Examiner-admitted deficiencies of Lofredo pointed out previously, Lofredo fails to teach or suggest each and every element of Applicants' independent claim 1.

Turning to Foster, it is also clear that Foster fails to cure Lofredo's deficiencies as applied to Applicants' independent claim 1. Foster teaches "[a] process for the production of ammonia which process comprises passing a feedstock containing nitrogen and hydrogen over a catalyst at a temperature, pressure and space velocity such that conversion to ammonia is effected" (Foster, claim 1).

First, Foster teaches *production of ammonia*, and not Applicants' claimed "*a hydrogen removing apparatus* arranged within the nuclear reactor-housing vessel" (claim 1, emphasis added). Second, Applicants' submit that Foster is *nonanalogous art*, and therefore is not properly applied in the context of an obviousness-based rejection of any of Applicants' claims. As the M.P.E.P. § 2141.01(a) sets forth, "To Rely on a Reference under 35 U.S.C. § 103, it must be Analogous Prior Art." ""In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992)." M.P.E.P. § 2141.01(a). Applicants submit that Foster's ammonia synthesis process is not analogous to Applicants' present claimed invention. Foster is concerned that "with increased pressure on the world's food resources the demand for nitrogen containing fertilisers based on ammonia has grown rapidly in recent years" (Foster, col. 1, lines 9 – 11). This is not even remotely analogous to Applicants' claimed "*hydrogen removing apparatus* arranged within the nuclear reactor-housing vessel" (claim 1, emphasis added).

As such, Lofredo and Foster, taken alone or in combination, lack any teaching or suggestion of at least the above-quoted elements of Applicants' independent claim 1. This clearly demonstrates how Lofredo and Foster are different from the present claimed invention, and that the Examiner's use of Foster is improper in the context of a 35 U.S.C. § 103(a) rejection of any of Applicants' claims at least for being nonanalogous art.

Therefore, the Examiner's application of Lofredo and Foster as references does not satisfy the tenants of a proper 35 U.S.C. § 103(a) rejection. "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the

prior art. *In re Royka*, [...]. "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, [...]"'. M.P.E.P. § 2143.03, internal citations omitted.

The Examiner has therefore not met an essential criteria for establishing a *prima facie* case of obviousness, wherein "the prior art reference (or references when combined) must teach or suggest all the claim limitations." *See* M.P.E.P. §§ 2142, 2143, and 2143.03.

Lack of Suggestion or Motivation to Modify or Combine Reference Teachings for Prima Facie Obviousness and Lack of Reasonable Expectation of Success for Prima Facie Obviousness

The M.P.E.P. sets forth some "Basic Considerations which Apply to Obviousness Rejections," as follows:

"When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to:

- (A) The claimed invention must be considered as a whole;
- (B) *The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;*
- (C) *The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and*
- (D) *Reasonable expectation of success is the standard with which obviousness is determined.*

Applicants has already established that the cited references do not teach or suggest all the elements of Applicants' independent claim 1, and therefore supplement those arguments to further demonstrate lack of obviousness as follows. The Examiner alleged that the combination of Lofredo and Foster "would have been obvious to one of ordinary skill in the art at the time of the invention to use ammonia synthesis ... as taught by Foster ... in the Lofredo system because catalytic components are standards in the industry..." (Office Action, p. 3).

The M.P.E.P. sets forth:

"Obviousness can only be established by combining or modifying the teaching of the prior art to produce the claimed invention where there is some

teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art.” “[I]t is necessary to ascertain whether or not the reference teaching would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification.” M.P.E.P. § 2143.01, emphasis added.

One skilled in the art would only arrive at the present claimed invention by consulting Applicants’ disclosure, yet “[t]he teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on [A]pplicant’s disclosure.” M.P.E.P. § 2142, internal citations omitted. Applicants submit that the teachings of Lofredo and Foster still do not provide the requisite motivation to one of ordinary skill in the art to facilitate their combination, *from within the references themselves*, implicitly or otherwise. For example, Foster’s focus on ammonia production by passing a feedstock over nitrogen and hydrogen (*See* Fosters’s claim 1, for example) could not possibly provide any motivation to one of ordinary skill in the art to be combined with Lofredo. Applicants also note that one of ordinary skill in the art must have this motivation or reason *without the benefit of Applicants’ specification* to modify the references.

Applicants therefore submit that one of ordinary skill in the art would not have been motivated to combine Lofredo with Foster, as there is nothing in particular to gain from such a combination, as what is obtained still does not lead one of ordinary skill in the art at the time the invention was made to achieve the present claimed invention. Applicants respectfully reminds the Examiner that “[t]he initial burden is on the Examiner to provide some suggestion of the desirability of doing what the inventor has done.” M.P.E.P. § 2142. The prior art references themselves must provide the motivation to combine, and the presently applied references clearly

fail to do so, therefore failing to provide some suggestion of the desirability of doing what Applicants have done.

As already demonstrated, the combination of these references as applied by the Examiner *a priori* fails to establish obviousness of the claimed invention. Furthermore, Applicants have pointed out deficiencies in the cited prior art that render nugatory any indication that the cited references would give any motivation or reason to one of ordinary skill in the art to modify them *without the benefits of Applicants' specification.*

Therefore, even the Examiner's assertion of Lofredo and Foster still does not establish that there would have been the requisite suggestion or motivation to modify either or both of them. "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination."

M.P.E.P. § 2143.01, p. 2100-126, citing *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990) (emphasis in original).

In addition, Applicants respectfully point out that determinations of *prima facie* obviousness must be supported by a finding of "substantial evidence." See *In re Zurko*, 258 F.3d 1379, 1386 (Fed. Cir. 2001). Specifically, unless "substantial evidence" found in the record supports the factual determinations central to the issue of patentability, *including motivation*, the rejection is improper and should be withdrawn. Applicants submit that the Examiner's assertion that the combination of Lofredo and Foster "would have been obvious" "because the catalytic components are standards in the industry..." (Office Action, p. 3) is not supported by substantial evidence.

In this case, Applicants submit the that there is no "substantial evidence" in the record to support the modification of Lofredo with Foster, and the requisite clear and particular motivation

required to support a *prima facie* case of obviousness is lacking. Applicants respectfully submit that the Examiner merely provided only conclusory statements supporting a motive for achieving Applicants' claimed combination. *See* Office Action, p. 3.

Therefore, in light of the deficiencies of Lofredo and Foster, Applicants respectfully submit that the Examiner points to no evidence supporting the notion that one of ordinary skill in the art, having Lofredo and/or Foster before him/her, would have been motivated to modify it to produce Applicants' present claimed invention, especially considering the fact that Lofredo focuses only on removal of *noble gases*, and Foster focuses on ammonia production. For at least these reasons, the Examiner fails to meet the burden for establishing a *prima facie* case of obviousness.

In addition, regarding the required reasonable expectation of success, as evidenced from previous arguments regarding the cited references, Applicants submit that there would be no reasonable expectation of success to be derived from modifying or combining the cited references, as this would diverge from the present invention, as claimed in Applicants' independent claim 1. This also demonstrates that the Examiner's reliance on Lofredo and Foster is not sufficient to establish *prima facie* obviousness.

Since Applicants have already demonstrated the deficiencies in the cited references and that they do not provide any suggestion or motivation to produce the present claimed invention, it logically flows that there would be no reasonable expectation of success expected by one of ordinary skill in the art when combining Lofredo with Foster.

In summary, the Examiner has not met any of the essential criteria for establishing a *prima facie* case of obviousness. Applicants have demonstrated above that the Examiner: (a) has not shown that all recitations of Applicants' claimed invention are taught or suggested by

Lofredo and Foster; (b) has not shown any requisite suggestion or motivation to modify Lofredo and Foster to produce Applicants' claimed invention; and (c) has not shown there would be any reasonable expectation of success from modifying Lofredo and Foster in order to produce the present claimed invention. Thus, Applicants submits that the Examiner's reliance on these references fails to establish *prima facie* obviousness.

Therefore, Applicants submits that independent claim 1 is allowable, for the reasons argued above.

Regarding dependent claims 2 – 7, and 11:

Finally, Applicants notes that the M.P.E.P. sets forth that “[i]f an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious.” M.P.E.P. § 2143.03. Therefore, dependent claims 2 – 7, and 11 are also allowable at least by virtue of their respective dependence from allowable base claim 1. Therefore, Applicants respectfully request that the Examiner withdraw the 35 U.S.C. § 103(a) rejection.

Regarding the Rejection of Claims 8 – 10 and 12 under 35 U.S.C. § 103(a):

Applicants respectfully traverse the rejection of claims 8 – 10 and 12 under 35 U.S.C. § 103(a) as unpatentable over Lofredo and Foster, and further in view of Chakraborty. Applicants submit that the rejection of claim 12 has been rendered moot by the cancellation of this claim, without prejudice or disclaimer of its subject matter.

Applicants have already discussed the Lofredo and Foster references in the previous section, and incorporate those arguments here, as equally pertinent to the Examiner's rejection of dependent claim 8 – 10.

The Examiner added Chakraborty to “disclose[] passively inerting the gas mixture forming in the reactor containment of a nuclear power plant,” in an attempt to cure additional Examiner-admitted deficiencies in Lofredo and Foster, namely, that “Lofredo and Foster et al.

does not teach the shape and placement of the catalyst" (Office Action, p. 3). In addition, Applicants note that Chakraborty also discloses that "[t]he catalytic recombiners, which are passive safety devices, represent mechanisms contributing considerably to reduce the risks involved in an accident situation as described, but they do not eliminate the danger. The possibilities of both pre-inerting and post-inerting do not appear to be practicable" (Chakraborty, col. 3, lines 3 – 9). Thus, Chakraborty fails to cure the deficiencies of Lofredo and Foster, rendering all three references, taken alone or in combination, incapable of teaching or suggesting all the elements of Applicants' independent claim 1.

Applicants submit that the application of Chakraborty fails to cure the deficiencies of Lofredo and Foster as applied to Applicants' independent claim 1, and therefore the rejection of Applicants' dependent claims 8 – 10 must also fail.

Therefore, Applicants again submit that independent claim 1 is allowable, for the reasons argued herein, and that dependent claims 8 – 10 are also allowable at least by virtue of their dependence from allowable base claim 1. Therefore, Applicants respectfully request that the Examiner withdraw the improper 35 U.S.C. § 103(a) rejection.

Conclusion:

In view of the foregoing, Applicants request reconsideration of the application and submit that the rejections detailed above should be withdrawn. This Amendment should allow for immediate and favorable action by the Examiner. Applicants submit that the pending claims are *prima facie* in condition for allowance. Applicants therefore request a favorable action in the form of issuance of a Notice of Allowance.

Should the Examiner continue to dispute the patentability of the claims after consideration of this Amendment, Applicants encourage the Examiner to contact Applicants'

undersigned representative by telephone to discuss any remaining issues or to resolve any misunderstandings. Applicants' undersigned representative would welcome the opportunity to discuss the merits of the present invention with the Examiner if telephone communication will aid in advancing prosecution of the present application.

Please grant any extensions of time under 37 C.F.R. § 1.136 required in entering this response. If there are any fees due under 37 C.F.R. § 1.16 or 1.17, including any fees required for an extension of time under 37 C.F.R. § 1.136, please charge such fees to our deposit account 06-0916.

Respectfully submitted,

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